Development and design of a mobile application with support of rephotography

Have you ever seen a historic photo and wondered how the passage of time has affected the place that the photo depicts? Historical photos of landscapes have a high culture and scientific value because they illustrate the past state of the environment. If one were to recapture the same view, at another time, the changes in nature could be compared. In today's world the environment is rapidly changing, and a landscape might look vastly different from one decade to another. This is why rephotography could play a crucial role in today's world. We developed two techniques for rephotography of historical photos in a mobile application: using the orientation of smartphones and transparency of Smapshot photos.

Smapshot is a web based project that allows volunteers to georeference historical photos. To georeference means that you associate the photo with a location in physical space. Meaning that you compute where, and how the camera was held when the photo was taken. Knowing this, we can use the information for rephotography.

This application provides an efficient way of recapturing historic photos, enabling us to compare changes between historic photos and recaptured versions. Figure 1 shows what the camera view looks like when recapturing a historic photo. It was approached from two different angles: interaction design and geographic data. Our findings shows that from a user perspective transparency is preferred, however using orientation data result in a more accurate re-creation of the historic photo.

Mobile devices contain sensors that can compute the orientation of the device. The application computes the orientation in real time and compares it to the orientation of the historic photo. This data is then used to guide the user how to hold the device in order to faithfully recreate the view of the historic photo. The other technique developed places the historic photo on top of the camera view, with transparency applied to it. This allows the user to align certain features of the transparent historic photo with the same features on the camera view. The two techniques developed were compared by letting test-users recapture photos, using the techniques separately, and then studying the results.

The design work was carried out in a user-centered design process, where users were involved in usability testing in order to evaluate the mobile application. One part of the design work was to research if there is an interest in using this kind of application and how to encourage usage by experimenting with gamification. The results show that there is an interest, dominated by occasional usage and that ranking recaptured photos with points on a leaderboard motivates the user.

This work lays a foundation for how the Smapshot team can further develop the idea of a mobile application and what to consider. There are other research fields that can be touched upon, such as using artificial intelligence to recognize environments which would replace the usage of GPS coordinates from smartphones.

Fig. 1. Screenshot of the camera view when recapturing a photo

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